

INTEGRATED ENERGY SYSTEMS — PRODUCTIVITY AND BUILDING SCIENCE PROGRAM

The New Buildings Institute's *Integrated Energy Systems — Productivity and Building Science Program* is dedicated to researching persistent building science questions and developing solutions with significant potential to save energy, improve indoor environmental quality and reduce operating and maintenance costs for building owners.

This three-year, \$6-million research effort, which is sponsored by the California Energy Commission's Public Interest Energy Research (PIER) program, consists of six distinct research elements. The program was launched in August 2000.

Research Element #4: Integrated Design of Small Commercial HVAC Systems

This element is researching the system performance problems of small packaged direct-expansion (DX) rooftop HVAC systems. Our research team is looking specifically at units with 10 tons or less of cooling capacity, a category that represents about 90% of installed small packaged DX systems and that serves about 50% of the commercial floor area in California.

Small HVAC systems are commonly comprised of inexpensive, unsophisticated designs and products that lend themselves to inefficiency and discomfort. Typical problems include non-functioning economizer controls, inappropriate thermostats, system oversizing, duct leakage and poor duct design, and improper refrigerant charge.

Project budget: \$745,000

Based on the technical and operational fixes identified, our research team will develop guidelines for specifying and installing high-performance systems, document energy savings potential and identify possible changes to codes.

Although most of the field research is scheduled for 2002, here are some early findings: ♦ Small packaged HVAC systems often have economizer controls even though these controls are not required, presenting an opportunity for increased efficiency. ♦ Around 70% of the economizers tested are not functional. ♦ Residential thermostats control roughly 20% of the small HVAC units. ♦ Some units have little or no ventilation air.

Key Research Milestones

Report on performance problems and building science solutions
Design guidelines

Completion Date

Winter 2003
Spring 2003

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For more information: www.newbuildings.org/pier
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